

IN THE CLAIMS

Please amend the claims as follows:

Claim 38 (Previously Presented): Process of manufacturing glass from vitrifiable materials comprising a step of supplying all or part of the thermal energy necessary for melting vitrifiable materials by injecting a combustible mixture comprising at least one fuel and at least one oxidizer gas, or gaseous products resulting from combustion of the combustible mixture, below the level of the mass of said vitrifiable materials, and melting said vitrifiable materials, wherein said vitrifiable materials comprise liquid or solid combustible elements, or mixtures thereof, and materials selected from the group consisting of batch materials, cullet, vitrifiable waste, and mixtures thereof.

Claim 39 (Previously Presented): Process according to claim 38, wherein the combustible elements are selected from the group consisting of coal, composite materials comprising glass and plastic, and organic materials.

Claim 40 (Previously Presented): Process according to claim 38, wherein the vitrifiable materials contain composite materials comprising glass and metal.

Claim 41 (Withdrawn): Process according to claim 38, additionally comprising refining said vitrifiable materials, at least partly in the form of a thin layer, after melting.

Claim 42 (Previously Presented): Process according to claim 38, wherein the oxidizer gas comprises air, oxygen-enriched air, or oxygen.

Claim 43 (Previously Presented): Process according to claim 38, wherein the melting of the vitrifiable materials takes place in at least one melting chamber which is equipped with burners passing through its side walls or passing through the floor wall or suspended from the roof or from superstructures, or any combination of sidewalls, floor and roof, so that combustion regions of said burners or combustion gases develop in the mass of vitrifiable materials being melted.

Claim 44 (Previously Presented): Process according to claim 38, wherein the combustion regions created by combustion of the combustible mixture or gaseous products resulting from combustion of the combustible mixture convectively stir the vitrifiable materials.

Claim 45 (Previously Presented): Process according to claim 43, wherein the height of the mass of vitrifiable materials in the melting chamber and the height at which the combustion regions or gases resulting from the combustion develop, are adjusted so that the said gases remain within the mass of said vitrifiable materials.

Claim 46 (Previously Presented): Process according to claim 38, wherein the melting is preceded by a step of preheating the vitrifiable materials to at most 900°C.

Claim 47 (Withdrawn): Process according to claim 41, wherein refining is carried out on the molten vitrifiable materials in a foamy state.

Claim 48 (Withdrawn): Process according to claim 47, wherein said molten vitrifiable materials in the foamy state comprise bubbles, most of which being at least 100 μm in diameter.

Claim 49 (Withdrawn): Process according to claim 41, wherein the vitrifiable materials contain refining promoters.

Claim 50 (Previously Presented): Process according to claim 38, wherein the melting is carried out at 1400°C at most.

Claim 51 (Withdrawn): Process according to claim 41, wherein melting is carried out in a melting chamber, and the refining is carried out in at least one static compartment lying downstream of the melting chamber, and having a flow-canal structure, and provided with one or more means for forcing the molten vitrifiable materials to be refined in a thin layer with plug-flow.

Claim 52 (Withdrawn): Process according to claim 51, wherein the said one or more means prevent the formation of a return glass current in the mass of molten vitrifiable materials flowing through said flow-canal structure.

Claim 53 (Withdrawn): Process according to claim 41, wherein the refining is carried out in a melting chamber containing a sieve or in at least one compartment lying downstream of the melting chamber, forcing the molten vitrifiable materials to follow a descending path by gravity between at least two adjacent walls which are essentially mutually parallel and at

least partially submerged in the mass of molten vitrifiable materials and are inclined with respect to the plane of the sieve of the said melting chamber or of the said downstream compartment.

Claim 54 (Withdrawn): Process according to claim 53, wherein the said walls are incorporated into at least one longitudinally partitioned tube of approximately rectangular section.

Claim 55 (Withdrawn): Process according to claim 51, wherein melting is carried out in a melting chamber and the refining is carried out in at least one compartment lying downstream of the melting chamber and capable of being rotated in order to ensure centrifugal refining, which compartment is provided with one or more means for forcing the molten vitrifiable materials to be refined in a thin layer, over a thickness R_1/R_0 of at least 0.8 or over an absolute thickness of at most 10 cm.

Claim 56 (Previously Presented): Process according to claim 43, wherein all or some of the vitrifiable materials are introduced into the melting chamber below the level of the mass of vitrifiable materials being melted.

Claim 57 (Withdrawn): Apparatus adapted for carrying out a step in manufacturing glass from vitrifiable materials comprising:

at least one melting chamber equipped with burners which are fed with at least one natural gas fossil fuel and with an air or oxygen oxidizer, the said burners being placed so as to inject said fuel and oxidizer, or gases resulting from combustion of said fuel and oxidizer, below the level of the mass of vitrifiable materials introduced into said melting chamber; said

vitrifiable materials comprising liquid or solid combustible elements, or mixtures thereof, and materials selected from the group consisting of batch materials, cullet, vitrifiable waste, and mixtures thereof.

Claim 58 (Withdrawn): Apparatus according to claim 57, which additionally comprises:

means for refining the molten vitrifiable materials in the form of a thin layer, in the melting chamber or in at least one refining compartment downstream of said chamber.

Claim 59 (Withdrawn): Apparatus adapted for carrying out a step in manufacturing glass from vitrifiable materials comprising:

at least one melting chamber equipped with burners which are fed with at least one natural gas fossil fuel and with an air or oxygen oxidizer, the said burners being placed so as to inject the said fuel and oxidizer, or gases resulting from combustion of said fuel and oxidizer, below the level of the mass of vitrifiable materials introduced into said melting chamber; and

means for refining the molten vitrifiable materials in the form of a thin layer, in the melting chamber or in at least one refining compartment downstream of said chamber.

Claim 60 (Withdrawn): Apparatus according to claim 59, wherein the refining compartment(s) is (are) static and has (have) a flow canal comprising a channel and a roof, one or more means of forcing the molten vitrifiable materials to be refined in said canal in a thin layer, with plug flow, and one of said means being selection of the ratio of the average height to the average width of the said canal to less than 1.

Claim 61 (Withdrawn): Apparatus according to claim 59, wherein the refining compartment(s) is (are) static and has (have) a flow canal comprising a channel and a roof, one or more means for forcing the molten vitrifiable materials to be refined in the said canal in a thin layer, and one of said means being at least one or more means for adjusting or regulating the flow of the molten vitrifiable materials at the inlet, or at the outlet, or at both the inlet and the outlet, of the refining compartment.

Claim 62 (Withdrawn): Apparatus according to claim 60, wherein the flow canal is equipped with heating means.

Claim 63 (Withdrawn): Apparatus according to claim 60, wherein the flow canal is provided with means for homogenizing the vitrifiable materials.

Claim 64 (Withdrawn): Apparatus according to claim 59, wherein the melting chamber, or a refining compartment downstream of the melting chamber, comprises at least one structural means for thin-film refining, in the form of at least two adjacent walls which are approximately mutually parallel, intended to be at least partially submerged in the mass of molten vitrifiable material and inclined with respect to the siege of said chamber or of said compartment.

Claim 65 (Withdrawn): Apparatus according to claim 64, wherein said walls are incorporated into at least one longitudinally partitioned tubular element.

Claim 66 (Withdrawn): Apparatus according to claim 65, wherein said tubular element(s) is (are) in the melting chamber and emerge(s) in a discharge opening downstream of said chamber.

Claim 67 (Withdrawn): Apparatus according to claim 59, wherein the refining compartment includes at least one device capable of being rotated in order to ensure centrifugal refining, the internal walls of the said device defining approximately a cavity in the form of a hollow cylinder which is vertical in its central part.

Claim 68 (Withdrawn): Apparatus according to claim 67, wherein the device capable of being rotated is provided in the cavity with partitions over at least part of its height, forcing the molten vitrifiable materials to flow between the internal walls of the device and said partitions, the average distance between the walls and the partitions defining the thickness of the thin layer.

Claim 69 (Withdrawn): Apparatus according to claim 68, wherein the average distance between the walls and the partitions is defined by a ratio of their radii R1/R0 of at least 0.8.

Claim 70 (Withdrawn): Apparatus according to claim 67, wherein the walls of the device are lined with electrocast refractory pieces.

Claim 71 (Withdrawn): Apparatus according to claim 67, wherein the device is provided with one or more means for trapping solid particles.

Claim 72 (Withdrawn): Apparatus according to claim 57, wherein the melting chamber is equipped with at least one means for introducing vitrifiable materials below the level of the mass of vitrifiable materials being melted.

Claim 73 (Withdrawn): Apparatus adapted for carrying out a step in manufacturing glass from vitrifiable materials comprising a melting chamber with walls made of a material comprising refractory materials, said chamber being associated with a cooling system using a water-based fluid, and wherein the walls are lined with a lining of a molybdenum-based metal.

Claim 74 (Withdrawn): Apparatus according to claim 73, wherein said lining is held at a distance from said walls.

Claim 75 (Withdrawn): Apparatus according to claim 73, wherein said lining constitutes a surface for contact with the molten materials, which surface is continuous or drilled with holes.

Claim 76 (Withdrawn): Apparatus according to claim 57, wherein at least some of the burners of the melting chamber are designed to also be able to inject, into the mass of vitrifiable materials, a fluid which does not participate in the combustion, as a substitute for the oxidizer or the fuel, or for both the oxidizer and the fuel.

Claim 77 (Previously Presented): Process according to claim 39, wherein the combustible elements are composite materials comprising glass and plastic, and which are laminated glazing or mineral fibers with organic binders.

Claim 78 (Previously Presented): Process according to claim 40, wherein the composite materials comprising glass and metal are at least one of glazing with metallic coating, glazing with enamel coating, and glazing with electrical connecting means.

Claim 79 (Withdrawn): Process according to claim 47, wherein the molten vitrifiable materials have a density of approximately 0.5 to 2 g/cm³.

Claim 80 (Withdrawn): Process according to claim 48, wherein most of the bubbles are at least 200 μm in diameter.

Claim 81 (Withdrawn): Process according to claim 49, wherein the refining promoters are selected from the group consisting of coke-based reducing additives having an average particle size of less than 200 μm , sulphate-based additives, fluorine-based additives, chlorine-based additives, and NaNO₃-based additives.

Claim 82 (Withdrawn): Process according to claim 41, wherein melting is carried out at 1380°C at most, and refining at 1500°C at most.

Claim 83 (Withdrawn): Process according to claim 41, wherein melting is carried out at 1350°C at most, and refining at 1500°C at most.

Claim 84 (Withdrawn): Process according to claim 51, wherein the thin layer has a depth of at most 15 cm.

Claim 85 (Withdrawn): Process according to claim 51, wherein the thin layer has a depth of at most 10 cm.

Claim 86 (Withdrawn): Apparatus according to claim 60, wherein the thin layer is over a depth of less than 15 cm.

Claim 87 (Withdrawn): Apparatus according to claim 60, wherein the ratio is less than 0.5.

Claim 88 (Withdrawn): Apparatus according to claim 61, wherein the thin layer has a depth of less than 15 cm.

Claim 89 (Withdrawn): Apparatus according to claim 62, wherein said heating means has oxygen burners above the molten vitrifiable materials.

Claim 90 (Withdrawn): Apparatus according to claim 65, wherein said at least one longitudinally partitioned tubular element has an approximately rectangular section.

Claim 91 (Withdrawn): Apparatus according to claim 70, wherein said electrocast refractory pieces include a thermal insulator incorporated so as to avoid being crushed by centrifugal force.

Claim 92 (Withdrawn): Apparatus according to claim 71, wherein said one or more means for trapping solid particles is located in a lower zone of the device and being in the form of notches or grooves made in the internal walls.

Claim 93 (Withdrawn): Apparatus according to claim 72, comprising at least two said means, in the form of one or more openings associated with a feed-screw supply means.

Claim 94 (Withdrawn): Apparatus according to claim 76, wherein the fluid is an N₂-containing inert gas, a water-based coolant, or a mixture thereof.

Claim 95 (Withdrawn): Process according to claim 53, wherein refining is carried out in the melting chamber.

Claim 96 (Withdrawn): Apparatus according to claim 58, wherein said means for refining is in the melting chamber.

Claim 97 (Withdrawn): Apparatus according to claim 59, wherein said means for refining is in the melting chamber.

Claim 98 (Previously Presented): A product obtained by the process of claim 38.

Claim 99 (Withdrawn): A product obtained by the process of claim 41.

Claim 100 (Previously Presented): The process according to claim 38, comprising additional steps, whereby said glass is manufactured.

Claim 101 (Previously Presented): The process according to claim 100, wherein the glass is flat glass.

Claim 102 (Previously Presented): The process according to claim 101, wherein the flat glass has a residual blue color and a solar-protection or fire-resistance function.

Claim 103 (Previously Presented): The process according to claim 100, wherein the glass is in the form of a bottle or a flask.

Claim 104 (Previously Presented): The process according to claim 100, wherein the glass is glass wool or glass fiber.

Claim 105 (Previously Presented): A process of recycling metal/glass or plastic/glass composite materials comprising a step of supplying all or part of the thermal energy necessary for melting vitrifiable materials by injecting a combustible mixture comprising at least one fuel and at least one oxidizer gas, or gaseous products resulting from combustion of the combustible mixture, below the level of the mass of said vitrifiable materials, and melting said vitrifiable materials, wherein said vitrifiable materials comprise liquid or solid combustible elements, or mixtures thereof, and materials selected from the group consisting of batch materials, cullet, vitrifiable waste, and mixtures thereof, during said recycling.

Claim 106 (Previously Presented): A process of manufacturing an electronic part comprising a step of supplying all or part of the thermal energy necessary for melting vitrifiable materials by injecting a combustible mixture comprising at least one fuel and at least one oxidizer gas, or gaseous products resulting from combustion of the combustible mixture, below the level of the mass of said vitrifiable materials, and melting said vitrifiable materials, wherein said vitrifiable materials comprise liquid or solid combustible elements, or

mixtures thereof, and materials selected from the group consisting of batch materials, cullet, vitrifiable waste, and mixtures thereof, during said manufacturing.

Claim 107 (Withdrawn): An apparatus for manufacturing glass comprising the apparatus of claim 57.

Claim 108 (Withdrawn): The apparatus according to claim 107, wherein the glass is flat glass.

Claim 109 (Withdrawn): The apparatus according to claim 108, wherein the flat glass has a residual blue color and a solar-protection or fire-resistance function.

Claim 110 (Withdrawn): The apparatus according to claim 107, wherein the glass is in the form of a bottle or a flask.

Claim 111 (Withdrawn): The apparatus according to claim 107, wherein the glass is glass wool or glass fiber.

Claim 112 (Withdrawn): An apparatus for recycling metal/glass or plastic/glass composite materials comprising employing the apparatus of claim 57 during said recycling.

Claim 113 (Withdrawn): An apparatus for manufacturing an electronic part comprising employing the apparatus of claim 57 during said manufacturing.

Claim 114 (Withdrawn): Apparatus adapted for carrying out a step in manufacturing glass from vitrifiable materials comprising:

at least one melting chamber equipped with burners which are fed with at least one natural gas fossil fuel and with an air or oxygen oxidizer, the said burners being placed so as to inject said fuel and oxidizer, or gases resulting from combustion of said fuel and oxidizer, below the level of the mass of vitrifiable materials introduced into said melting chamber; and means for refining the molten vitrifiable materials in the form of a thin layer, in the melting chamber or in at least one refining compartment downstream of said chamber.

Claim 115 (Currently Amended): Process according to claim 38 of manufacturing glass from vitrifiable materials comprising a step of supplying all or part of the thermal energy necessary for melting vitrifiable materials by injecting a combustible mixture comprising at least one fuel and at least one oxidizer gas, or gaseous products resulting from combustion of the combustible mixture, below the level of the mass of said vitrifiable materials, and melting said vitrifiable materials, wherein said vitrifiable materials comprise liquid or solid combustible elements, or mixtures thereof, and materials selected from the group consisting of batch materials, cullet, vitrifiable waste, and mixtures thereof, wherein the vitrifiable material is melted into a foamy glass.

Claim 116 (Previously Presented): Process according to claim 115, wherein the foamy glass has a density of approximately 0.5 to 2 g/cm³.

DISCUSSION OF THE AMENDMENT

Claim 115 has been amended into independent form.

No new matter has been added. 38-40, 42-46, 50, 56, 77, 78, 98, 100-106, 115 and 116 remain active; Claims 41, 47-49, 51-55, 57-76, 79-97, 99 and 107-114 stand withdrawn from consideration.